AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all previous listings, and versions, of claims in the application.

Listing of Claims:

1. (Currently Amended) An imaging apparatus for evaluating a biological system, the apparatus comprising:

a plurality of collection devices, the plurality of collection devices comprising an imaging device configured to obtain an image of the biological system and a hyperspectral camera configured to obtain a hyperspectral data cube of the biological system;

~~an integrator for integration of spatial, spectral and temporal features, and optionally other features that create a diagnostic module comprising physiologic data or calibration data, in a spectral and temporal multimodal imaging system for the evaluation of biological systems and stimuli;~~ and

a fuser for fusing ~~a thermal image or other imaging modalities and~~ the image with the hyperspectral data cube to obtain a measure of a physiological function of the biological system ~~for assessment of biological processes~~.

2. (Currently Amended) The imaging apparatus of claim 1, wherein the ~~integrated features are two or more of visible or infrared hyperspectral images,~~ image comprises a visible brightfield image, [[or]] an infrared brightfield image[[s]], a thermal image[[s]], a fluorescence image[[s]], a Raman image[[s]], or a combination[[s]] thereof.

3. (Currently Amended) The imaging apparatus of claim 1, further comprising: a ~~specific~~ UV, visible or infrared light source~~, and a collector for collecting two or more of visible or infrared hyperspectral images, visible or infrared brightfield images, thermal images, fluorescence images, Raman images, or combinations thereof~~.

4. (Currently Amended) The imaging apparatus of claim [[1]] 3, wherein the light source ~~can be controlled to limit the illumination to only~~ is configured to illuminate the biological system with a single spectral band or a group of spectral bands.

5. (Currently Amended) The imaging apparatus of claim 1, further comprising ~~wherein the multimodal imaging systems includes~~ a collection optic that is an endoscope.

6. (Currently Amended) The imaging apparatus of claim 1, further comprising an inputs for a signal[[s]] from an instrument[[s]] monitoring a biological function of the biological system, the apparatus being configured to synchronize ~~to allow the synchronization of~~ the collection of the image[[s]] and the hyperspectral data cube to the biological function based on the signal ~~process~~.

7-8. (Canceled)

9. (Currently Amended) The imaging apparatus of claim 1, further comprising a stabilizer for stabilizing the image and the hyperspectral data cube ~~and integrating imagery and data sets in a temporally and geometrically dynamic environment in such a way that the integrated data sets can be interpreted~~.

10. (Currently Amended) The imaging apparatus of claim 1, further comprising an image registration device to maintain ~~image~~ centering of the image and of the hyperspectral data cube.

11. (Currently Amended) The imaging apparatus of claim 1, further comprising a reference frame device that is visible in the hyperspectral data cube and in the image ~~images across multiple spectra as well as in thermal images for multimodal fusion~~.

12. (Currently Amended) The imaging apparatus of claim 1 further comprising: a tracked imaging apparatus ~~comprising a unifier~~ for creating a unified spatial mosaic of individual hyperspectral ~~image~~ data cubes taken at various locations and times.

13-40. (Canceled)

41. (New) The imaging apparatus of claim 1, wherein the hyperspectral data cube comprises at least one of a visible hyperspectral image and a thermal hyperspectral image.

42. (New) The imaging apparatus of claim 1, further comprising a CCD, wherein the imaging device has the same field of view as the CCD.

43. (New) The imaging apparatus of claim 1, wherein the imaging device comprises an infrared focal plane array.

44. (New) The imaging apparatus of claim 1, wherein the apparatus is configured to interlace operation of the imaging device and the hyperspectral camera.

45. (New) The imaging apparatus of claim 1, wherein the apparatus is configured to determine a spatial distribution of oxyhemoglobin, deoxyhemoglobin, and methemoglobin in the biological system based on the image and the hyperspectral data cube.

46. (New) The imaging apparatus of claim 1, wherein the apparatus is configured to register multiple images in the hyperspectral data cube acquired at various wavelengths and at different times so that each corresponding pixel in every image images the same point in space.

47. (New) The imaging apparatus of claim 1, wherein the imaging device comprises an MR imager, a CT imager, a PET imager, a SPECT imager, an ultrasound imager, or a combination thereof.

48. (New) The imaging apparatus of claim 1, wherein the hyperspectral camera is configured to obtain a visible hyperspectral data cube and wherein the imaging device comprises a second hyperspectral camera configured to obtain a near-infrared hyperspectral data cube.

49. (New) The imaging apparatus of claim 1, wherein the plurality of collection devices share a common optical path.

50. (New) The imaging apparatus of claim 49, further comprising at least one beamsplitter positioned along the common optical path and configured to direct a signal to the imaging device.

51. (New) The imaging apparatus of claim 1, wherein the fuser adds the image as a plane to the hyperspectral data cube.

52. (New) The imaging apparatus of claim 1, wherein the hyperspectral data cube comprises a plurality of wavelength images, and wherein the fuser fuses the image to each of the wavelength images.

53. (New) The imaging apparatus of claim 1, wherein the hyperspectral data cube comprises a plurality of wavelength planes, and wherein the fuser weights each wavelength plane based on a degree of variation in the image.